SECTION 956—DETECTORS

956.1 DESCRIPTION—This work is the furnishing and installation of devices to sense the presence or passage of vehicles or pedestrians.

956.2 MATERIAL—Sections 950.2, 1104.01, and 1104.07

956.3 CONSTRUCTION—Section 950.3, as shown on the Standard Drawings, and as follows:

(a) Loop Detector. Saw cut slots in the pavement for the sensor, as indicated. Rotary drill a hole for the conduit at curb. Blow the slot and hole free of moisture and debris. Install the conduit. Install the number of sensor turns to obtain the inductance required by the manufacturer to achieve proper operation, without splices, kinks, or curls, and without straining or stretching around the corners of the slot. Install a minimum of two turns of wire for each loop detector. Use a blunt nonmetallic tool to seat the sensor in the bottom of the slot. Check for slack, raised portions, and tightness. Correct if necessary. Insert the two leads from the loop, twisted together a minimum of 10 turns per meter (3 turns per foot), in the conduit leading to the junction box. Test leakage resistance, series resistance, and inductance before sealing the sawcut slot. Leakage resistance greater than 10 megohms is necessary when tested at 375 V(dc) minimum. Series resistance is not to exceed 2.6 ohms per 300 m (1,000 feet). Inductance is to be between 50 microhenries and 700 microhenries. Seal the conduit with duct seal. Seal the hole and slots with sealant, according to the manufacturer's instructions. Do not apply the sealant if the air temperature is below 7 °C (45F), or during precipitation. Fill the slot to within 3 mm (1/8 inch) of the pavement surface and ensure that there are no voids. Do not allow traffic on the slot until the sealant is cured. Remove excess sealant from adjacent road surfaces, but do not use solvents.

If the contract includes resurfacing in the loop area, install the sensor in the existing pavement structure or in the binder course before placement of the wearing course. Do not install the top course of pavement before the sealant is cured.

Splice the sensor wires to the lead-in cable as shown on the Standard Drawings. Encapsulate the splice with sealant to prevent water from penetrating the splice. Connect the sensor to each lead-in pair, as indicated. Band all excess loop sensor/lead-in cable in the junction box to prevent movement resulting in false calls. Extend the lead-in cable to the terminal strip in the controller cabinet, without splices. Measure inductance of loop and lead-in. Inductance is to be between 50 microhenries and 700 microhenries. Place a record of the inductance readings in the controller cabinet. Connect to the loop detector amplifier. Adjust the amplifier, according to the manufacturer's instructions, to obtain the necessary sensitivity.

(b) Magnetometer Detector. Before installation, conduct the manufacturer’s test to determine if the earth’s magnetic flux at the point of installation is sufficient for the detector to operate. Rotary drill a hole in the pavement for the sensor. Saw cut slots for the lead, as indicated. Rotary drill a hole for the conduit at curb. Blow the holes and slot free of moisture and debris. Install the conduit. Insert the sensor vertically in the hole. Then insert the lead wire in the slot and in the conduit leading to the junction box. Use a blunt nonmetallic tool to seat the wires in the bottom of the slot. Test leakage resistance and series resistance. Leakage resistance greater than 10 megohms is necessary. Series resistance is not to exceed 2.6 ohms per 300 m (1,000 feet). Backfill the sensor hole, then seal the holes and slot with sealant, according to the manufacturer's instructions. Do not apply the sealant if the air temperature is below 7 °C (45F), or during precipitation.

Complete the installation for the magnetometer detector, as specified in Section 956.3(a).

(c) Magnetic Detector. Bore a tunnel, without disturbing the pavement, from the junction box to a point approximately 0.6 m (2 feet) beyond the centerline of the detection zone. Bore a diameter only large enough to insert the conduit. Repair any damage to the roadway caused by boring. Insert the capped, rigid, nonmetallic conduit in the tunnel, using a proper lubricant if necessary. Insert the sensor within the conduit. Test leakage resistance and series resistance. Leakage resistance greater than 10 megohms is necessary. Series resistance is not to exceed more than 2.6 ohms per 300 m (1,000 feet).

Complete the magnetic detector installation, as specified in Section 956.3(a). Adjust the location of the sensor to obtain proper operation.

(d) Pedestrian Pushbutton. Install the pedestrian pushbutton and indicated sign, using stainless steel vandal-resistant, machine screws, rivets, or stainless steel banding taking care not to impair the message on the sign. Ensure that the pushbutton and sign is right side up. Drill and tap mounting holes of the size and pattern specified by the manufacturer. Drill and deburr the cable entrance hole. Connect the pushbutton according to the manufacturer's instructions, as indicated, and as shown on the Standard Drawings. Provide sealant above pushbutton where it abuts connecting support.

Field-test the operation by activating the pushbutton and performing a visual check of the controller indicator lights and a timing check of the pedestrian phase or phase extension.

(e) Microwave Sensor. Install and mount according to the manufacturer's instructions to provide area of detection and operation as indicated without detecting conflicting movements. Secure sensors using appropriate mounting brackets as required by the manufacturer.

(f) Video Detector. Install and mount according to the manufacturer's instructions to provide area of detection and operation as indicated without detecting conflicting movements. Secure detectors using appropriate mounting brackets as required by the manufacturer. Adjust and realign video detector as necessary to obtain optimal detection zone. Mount at a minimum height of 9 m (30 feet) above the roadway.

956.4 MEASUREMENT AND PAYMENT—Section 950.4 and as follows:

(a) Detector Lead-In Cable. Meter (Linear Foot)

(b) Detector Card Rack Assembly. Each
Unless provided as part of new controller assembly.

(c) Loop Sensors. Meter (Linear Foot)
The Contractor will measure along sawcut to where it enters conduit.
The sensor in conduit is incidental to the payment for conduit.

(d) Loop Amplifiers. Each
For the type indicated.

(e) Magnetometer Sensor. Each

(f) Magnetometer Amplifiers. Each
For the type indicated.

(g) Magnetic Sensors. Each

(h) Magnetic Amplifiers. Each
For the type indicated.

(i) Pedestrian Pushbuttons. Each
The price includes signs and mounting hardware.

(j) Microwave Sensor. Each
The price includes cable, controller interface, and mounting hardware for complete installation.

(k) Video Detector. Each
The price includes cable, controller interface, video monitor for setting up detection zone, mounting hardware, and all software for complete installation.